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DIMENSIONS FOR MAGNETIC OXIDE CORES AND ASSOCIATED COIL FORMERS FOR USE IN POWER SUPPLIES (EC-CORES)

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DIMENSIONS FOR MAGNETIC OXIDE CORES AND ASSOCIATED COIL FORMERS FOR USE IN POWER SUPPLIES (EC-CORES)

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Indian Standard

DIMENSIONS FOR MAGNETIC OXIDE CORES AND ASSOCIATED COIL FORMERS FOR USE IN POWER SUPPLIES (EC-CORES)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 27 October 1980, after the draft finalized by the Magnetic Components and Ferrite Materials Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 In the preparation of this standard, assistance has been derived from IEC Pub. 647-1979 ' Dimensions for magnetic oxide cores intended for use in power supplies (EC-Cores) ', issued by International Electrotechnical Commission.

1. SCOPE

1.1 This standard specifies the physical and magnetic dimensions of EC-Cores made of magnetic oxides for use in high flux density applications and covers preferred dimensions of these cores together with their tolerances as far as these are of importance for mechanical and electrical interchangeability.

NOTE — This high flux density application specifically covers cores designed for use in power transformers, for example, for switched mode power supplies operating typically at 25 kHz switching frequency.

2. DIMENSIONS

2.1 The dimensions of core of primary standards category are given in Table 1.

NOTE — The dimensions of the cores may be checked by means of gauges. A standard for these gauges is given in Table 2. In order to facilitate production it may be necessary to use gauges having dimensions differing from those given in Table 2, but the dimensions of the cores shall always comply with Table 1.

2.2 Magnetic Dimensions — The effective parameters of a pair of cores measured by the method given in IS : 7616-1974* are given below:

Effective Parameter	*Unit*	*Core Size*			
		EC 35	EC 41	EC 52	EC 70
Core constant, $C_1\left(\Sigma\frac{l}{A}\right)$	mm^{-1}	0·918	0·735	0·581	0·514
Effective magnetic length, l_e	mm	77·4	89·3	105	144
Effective cross-sectional area, A_e	mm^2	84·3	121	180	279
Effective volume, V_e	mm^3	6 530	10 800	18 800	40 100

NOTE — The radii on the inside of the outer limbs reference dimension d_1 have been neglected since, in compensating, the slot has been taken as circular.

2.3 Coil Former Dimensions — The essential dimensions of the coil former suitable for use with pairs of cores are given in Table 3.

2.4 Parties interested in making or using EC cores may find it desirable to lay down local standards for everyday use. These may show the dimensions in greater details than in **2.1** to **2.3** and may correspond to the local state of the art. In doing so, care should be taken not to exclude any other type of EC cores which the primary standards category and which also meets the requirements of the user.

2.5 A possible standard for coil formers, giving more details than in Table 3 has been given in Appendix A for illustration purposes.

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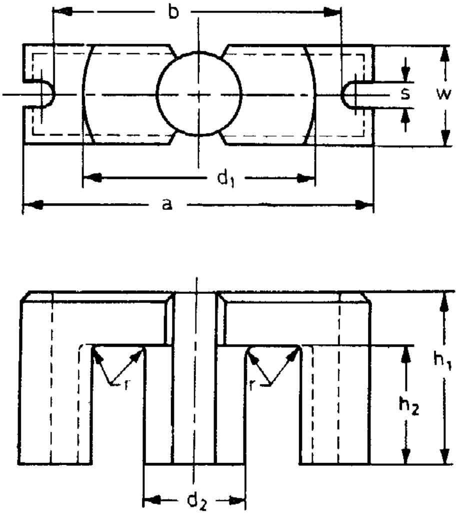
*Guide for calculation of the effective parameters of magnetic piece parts.

TABLE 1 DIMENSIONS OF CORES

[*Clause* 2.1, and *Table* 2 (*Note* 1)]

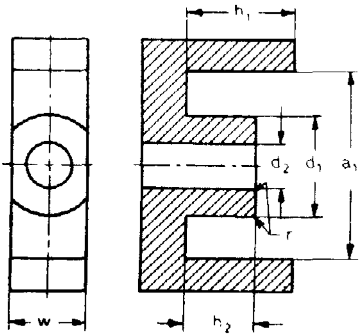


All dimensions in millimetres.

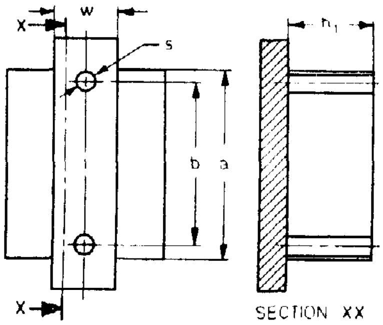
Size		EC 35	EC 41	EC 52	EC 70
a	*Min*	33·7	39·6	50·9	68·3
	Max	35·3	41·6	53·5	71·7
b	*Min*	27·7	32·6	42·7	57·9
	Max	29·3	34·6	45·3	61·3
d_1	*Min*	22·2	26·3	32·1	43·3
	Max	23·3	27·8	33·9	45·7
d_2	*Min*	9·2	11·3	13·05	16·0
	Max	9·8	11·9	13·75	16·8
h_1	*Min*	17·15	19·35	24·05	34·35
	Max	17·45	19·65	24·35	34·65
h_2	*Min*	11·9	13·5	15·5	22·3
	Max	12·6	14·3	16·3	23·2
w	*Min*	9·2	11·3	13·05	16·0
	Max	9·8	11·9	13·75	16·8
s	*Min*	2·5	3·0	3·5	4·5
	Max	3·0	3·5	4·0	5·0
	Max	0·5	0·7	0·8	1·0

TABLE 2 DIMENSIONS OF GAUGES

[*Clause* 2.1 (*Note*)]



GAUGE A



GAUGE B

All dimensions in millimetres.

Gauge	Size		EC 35	EC 41	EC 52	EC 70
GAUGE A	a	*Min*	35·305	41·605	53·505	71·705
		Max	35·315	41·615	53·515	71·715
	d_1	*Min*	22·185	26·285	32·085	43·285
		Max	22·195	26·295	32·095	43·295
	d_2	*Min*	9·805	11·905	13·755	16·805
		Max	9·815	11·915	13·765	16·815
	h_1	*Min*	18	20	25	35
	h_2	*Min*	11·90	13·50	15·50	22·30
		Max	11·91	13·51	15·51	22·31
	w	*Min*	15	18	20	24
GAUGE B	a'	*Min*	36	42	54	72
	b	*Min*	31·39	37·19	48·39	65·39
		Max	31·40	37·20	48·40	65·40
	h'	*Min*	18	20	25	35
	w'	*Min*	9·985	12·185	14·135	17·285
		Max	10·000	12·200	14·150	17·300
	s	*Min*	2·10	2·60	3·10	4·10
		Max	2·11	2·61	3·11	4·11
	r	*Min*	0·5	0·7	0·8	1·0

(*Continued*)

TABLE 2 DIMENSIONS OF GAUGES — *Contd*

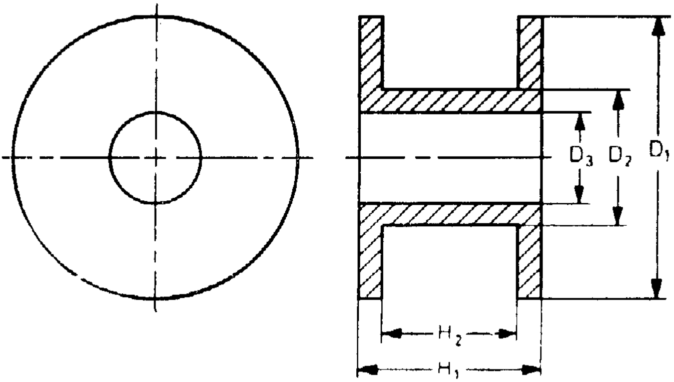
NOTE 1 — In order to facilitate production it may be necessary to use gauges having dimensions differing from those given in Table 2, but the dimensions of the cores shall always comply with Table 1.

NOTE 2 — To check the winding space, gauge A shall be fully inserted into the core without forcing; the gauge shall meet the bottom of the core without clearance.

NOTE 3 — To check the twisting of the core, the core shall be fully inserted, limbs first, into gauge B without forcing; the core shall meet the bottom of the gauge without clearance.

TABLE 3 ESSENTIAL DIMENSIONS OF COIL FORMERS

(*Clauses* 2.3 *and* 2.5)



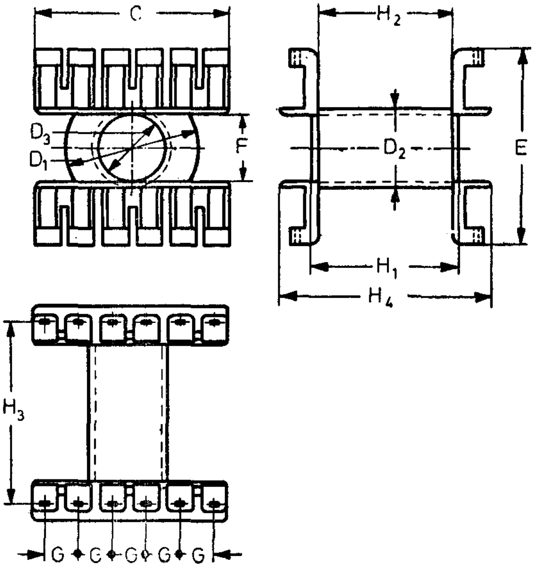
All dimensions in millimetres.

SIZE	EC 35	EC 41	EC 52	EC 70
D_1, *Max*	21·8	25·8	31·6	42·7
D_2, *Max*	12·3	14·4	16·3	19·6
D_3, *Min*	9·9	12·0	13·85	17·0
H_1, *Max*	23·6	26·8	30·7	44·3
H_2, *Min*	21·4	24·4	28·2	41·3

APPENDIX A

(*Clause* 2.5)

EXAMPLE OF A STANDARD FOR COIL FORMERS FOR EC-CORES MEETING THE PRIMARY STANDARDS



All dimensions in millimetres.

Reference	EC 35			EC 41			EC 52			EC 70		
	Min	*Nom*	*Max*	*Min*	*Nom*	*Max*	*Min*	*Nom*	*Max*	*Min*	*Nom*	*Max*
C	28·4	—	28·8	28·4	—	28·8	43·6	—	44·0	56·3	—	56·7
D_1	21·5	—	21·8	25·5	—	25·8	31·3	—	31·6	42·4	—	42·7
D_2	12·1	—	12·3	14·2	—	14·4	16·1	—	16·3	19·4	—	19·6
D_3	9·9	—	10·1	12·0	—	12·2	13·85	—	14·05	17·0	—	17·3
E	32·4	—	32·8	37·0	—	37·4	42·7	—	43·1	56·0	—	56·5
F	9·9	—	10·1	12·0	—	12·2	13·85	—	14·05	17·0	—	17·3
G	—	7·62	—	—	7·62	—	—	7·62	—	—	10·16	—
H_1	23·4	—	23·6	26·6	—	26·8	30·4	—	30·7	44·0	—	44·3
H_2	21·4	—	21·6	24·4	—	24·6	28·2	—	28·4	41·3	—	41·6
H_3	30·43	—	30·53	32·97	—	33·07	38·05	—	38·15	50·75	—	50·85
H_4	33·8	—	34·2	38·3	—	38·5	44·2	—	44·5	57·6	—	58·0